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Sustainable Lighting Goes to School

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The Evergreen State College in Olympia, Washington, is a liberal arts and sciences school with a different approach to education than most colleges. Its 4,100 students enroll in a single comprehensive program rather than a series of separate courses. Classes are small in size, with 'homerooms' and meeting spaces that resemble seminar rooms. A student's learning and progress is assessed in narrative evaluations rather than grades. Collaborative learning is prioritized, and campus governance is guided by a philosophy of collaborative problem-solving.

Green practices are also encouraged throughout the woodsy campus, and when the college set out to build Seminar II, the newly opened 159,000-square-foot complex designed by Seattle-based Mahlum Architects, administrators and staff wanted it to serve as a learning model for green building projects. As the first new academic facility to be built on the campus in more than 25 years, the building needed to blend with its surroundings, yet promote the school's culture and its focus on ecology.

From the earliest stages of the project, it was the client and architect's intention to produce a LEED-rated project that achieved at least the silver level. To ensure the building was positioned for optimal access to daylight and to facilitate natural ventilation, all project consultants were engaged prior to siting the building. As the lighting designer for both the interior and exterior spaces, Candela was charged with developing a lighting scheme that would fall 10 percent below the acceptable levels of the local energy code, as well as meet the LEED light-trespass requirements.

Sustainable Strategies

Seminar II comprises five learning clusters with staff offices, student homerooms, an art gallery for student work, and large stepped-floor lecture halls. The clusters are organized vertically to reduce the building's footprint and to encourage interaction among community members.

Although the concrete exterior of the building resembles other structures on campus, the airy, bright and contemporary interior aesthetic differs considerably, and promotes sustainability by using recycled and locally produced materials, and avoids finishes like paint, carpet or gypsum board that often have high VOCs (volatile organic compounds), which can emit noxious fumes and contribute to unhealthy air quality.

On this project, 'eco-charettes' were conducted early in the design process to produce a roadmap for achieving the necessary LEED points. Eco-charettes, are informal brainstorming sessions that

encourage design teams to focus on the sustainable aspects of a building, creating synergies within the project. Typically hosted at the beginning of design, it provides an opportunity for the owner, architect, and entire design team to collaborate about project goals, design possibilities and the integration of sustainable technologies.

The total number of LEED points obtainable through lighting components in a building varies according to the project, and can range from 4 to 12 points out of the total possible 69 points available for a LEED rating.

Specific LEED points for this project were sought in the following areas: light pollution reduction, optimized energy performance, controls, daylight and views, and were rated according to the three levels of achievability as stipulated on the LEED scorecard: easy, (no cost or reduced cost to implement), moderate (somewhat difficult or more costly, but the potential benefit was greater), and difficult (very costly or difficult to achieve and may not be worth the benefit).

The schematic design narrative described the quality of light, light level and expected load based on a 10 percent reduction in energy over the state code requirement (which is already 10 percent below ASHRAE 90.1-1999, the measuring standard for LEED). The report included task requirements and light level ranges along with the energy usage goal for each space type. Since the Washington State energy code is more stringent than ASHRAE 90.1, meeting the local code was a substantial step toward meeting the overall conservation goal. The final design was 19 percent below the Washington State Energy code, and approximately 29 percent below the LEED standard.

Equipment Selection

Visitors are guided through the pedestrian campus to Seminar II by an exterior lighting scheme consisting of lampposts on perimeter walkways, bollards on the bike path, and a combination of wallwashers and up/downlights on the covered walkways. Exterior lamp sources include ceramic metal halide and compact fluorescent. Cut-off fixtures limit light to the ground plane, reduce glare on pedestrian pathways, and eliminate light trespass beyond the building site. In addition, a few courtyard trees are accented with uplights that are controlled by a timer and turn off at 9:30 at night. Steplights integrated into bridge handrails provide for safety after dark, while metal halide wallwashers illuminate the wood-clad building entries.

The interior lighting uses a combination of T8, T5, 32W triple-tube and F40 twin-tube lamps. The only exceptions are a halogen accent lighting and wallwashing system in the art gallery, and track lighting that allows large classrooms to become occasional performance spaces. Since the building is intended to have a life span of at least 50 years, the light fixtures were evaluated for durability and ease of maintenance. All lighting systems complement skylights and daylighting in the facility. Daylighting is employed in the offices and classrooms using light shelves. While there are no daylighting controls, general controls are circuited to be manually changed and the classrooms have occupancy sensors.

All classrooms, homerooms and seminar rooms require dimming for projection conditions. Rather than use a switched fluorescent and a redundant incandescent system, which would have

required maintaining two different lamping scenarios and created more clutter in the ceiling, the fluorescent system has dual controls. The uplight component of the fixture was switched, and the isolated downlight component was dimmed. During lectures, both lights are used; for low-level note-taking, the uplight is switched off and the downlight is dimmed. Limiting dimming capability to the downlight was a way to maximize flexibility and minimize cost.

T5 lamps were used for most of the wallwashing applications and for the private offices. The smaller diameter lamp allows for a fixture with more controlled optics; it uses less material than its larger T8 counterpart and is less costly; and the T5 lamp also has a lower mercury content.

According to Michel George, Evergreen State College's director of facilities, Seminar II is 'as 'green' as we could make it.' The building opened in May 2004 and its LEED application is currently undergoing review. Collaborative eco-charettes, thoughtful site planning and energy-effective design contributed to this project's success, creating a model for green building strategies and continuing the college's legacy of commitment to the Earth's resources.

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